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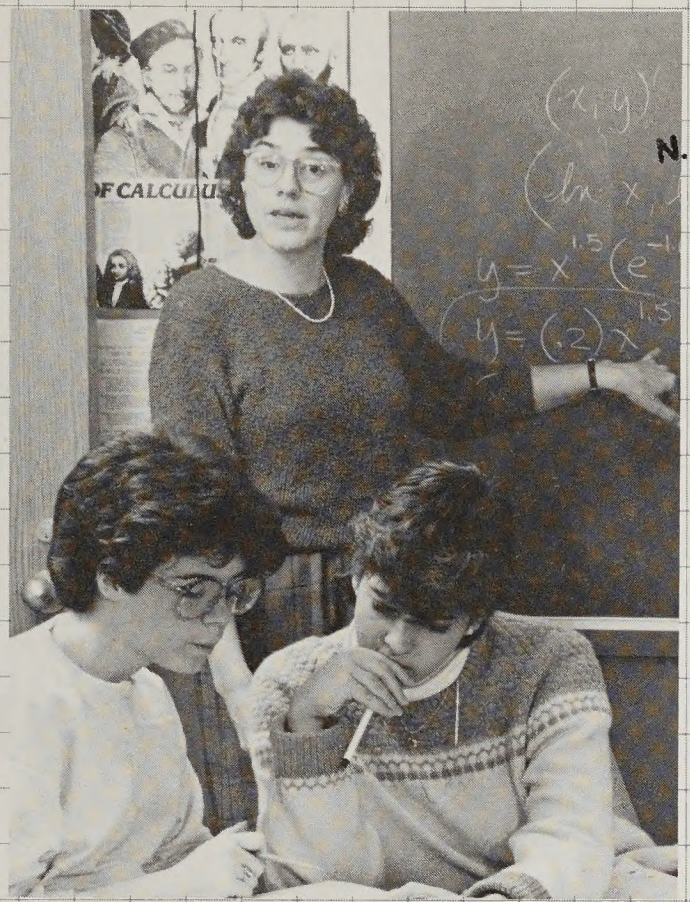

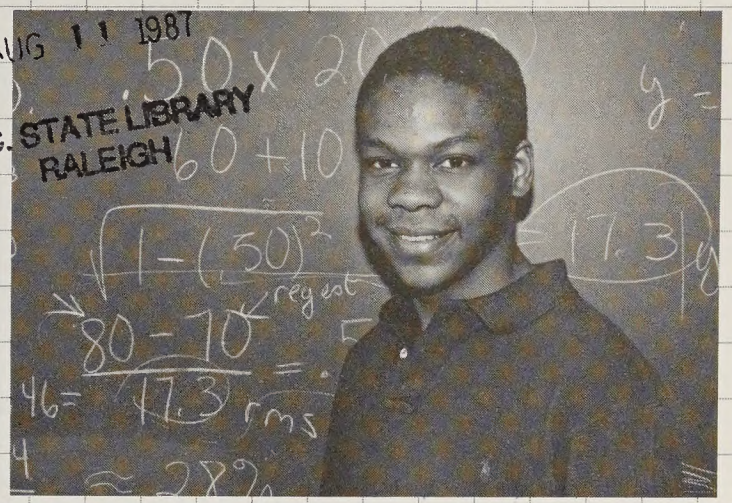

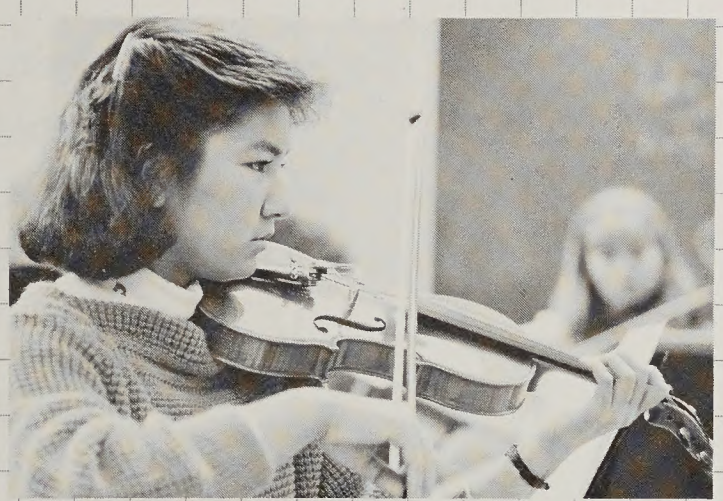

COURSES

NORTH CAROLINA SCHOOL OF SCIENCE AND MATHEMATICS

an affiliate school of the University of North Carolina

The North Carolina School of Science and Mathematics

Course Catalogue 1987 - 1988

Course Descriptions
Study Options
Special Programs
Graduation Requirements

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INTRODUCTION

The course offerings described in the following pages have been developed for the 1987-1988 school year. They have been designed to provide both depth and breadth in the instructional program. Advanced studies are available in all the academic disciplines represented in the curriculum with particularly varied and challenging choices available in mathematics and the sciences. Every effort is made to accommodate the student's individual interests, with final decisions on any year's course offerings based on staff availability and satisfaction of minimum enrollment requirements.

The first consideration in building each student's course of study is to ensure a thorough grounding in mathematical, scientific, and communications skills and concepts. Students are urged to select an advanced sequence in at least one discipline in science and/or mathematics and also to sample other areas of study through their choice of electives. The objective is for students to learn enough about a variety of academic disciplines, in mathematics and the sciences and in other fields, to become informed decision makers and competent leaders in the technological world of the twenty-first century.

Each student has the opportunity to discuss course selections with the instructors and with faculty/staff advisors, the Guidance staff, and the Registrar, who work together to ensure the appropriateness of each student's program. Consideration is given to the student's academic background, interests, and ability, to personal growth, and to issues of college admission.

In order to address more fully the diverse needs, interests, and learning styles of a talented student population, the following credit-bearing study options are also provided. Independent Study Projects and Seminar Studies are developed directly with and approved by the faculty and staff. Individualized study of all courses is available, subject to agreement between instructor and student with subsequent authorization by the Principal. Mentor placements with faculty or other professional personnel in neighboring universities, colleges, museums, institutes, laboratories, or industries are arranged and supervised by the Mentor Program Coordinator, who is a member of the instructional staff.

The graduation requirements listed on the final pages specify that English and mathematics must be included in every student's program each semester and that juniors must be enrolled in science and foreign language. American history and literature are also required in the junior year. Each student is required to register for a minimum of five courses per semester.

Grade reports are issued to students and parents on a quarterly basis, and in the initial and final quarters of a course include both a letter grade and a written evaluation. In addition, supplementary evaluations are sent when appropriate. The system of class rank is not used, since the school population is highly motivated and selected through a competitive admissions process. The following letter evaluation system is used and interpreted on school documents:

A - Outstanding achievement
B - Superior, meets all course requirements
C - Acceptable, minimally meets course requirements
D - Unsatisfactory, no NCSSM credit
I - Incomplete
S - Satisfactory
U - Unsatisfactory

Semester courses earn one-half unit of credit and year courses one full unit of credit. Partial credit is not granted. Additional information on registration procedures is included in the Student Handbook.

Provision is made for modifying a course schedule after the start of the academic year under specific guidelines also published in the Student Handbook.

COURSE DESCRIPTIONS

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Graduation Requirements in Mathematics

All students must successfully complete MA120 Introduction to College Mathematics, be enrolled in a mathematics course each semester, and successfully complete one unit of mathematics each year. Students who have completed geometry prior to entry must complete two units of mathematics. Students who have not taken geometry must complete three units of mathematics and one unit must be MA105 Geometry. Courses at the 200-level do not fulfill any of these mathematics requirements. Students must also demonstrate computer competency either by enrollment in a computer science course at this school or by consultation with the department.

Placement

Juniors will be placed in the course best suited for them as determined by the Mathematics Department based on placement tests, previous background, and interviews.

Placement of seniors is determined by the mathematics courses they complete as juniors. The department understands there will be individual differences that need to be considered as students are placed in senior level courses.

Course Offerings

MA100 ALGEBRA. One year (1 unit of credit).
Prerequisite: Algebra 1
This junior level course establishes the fundamentals of algebra found in Algebra 1 and 2, namely, manipulation of algebraic symbols and translation of word problems into algebraic expressions. Topics covered in the course include the arithmetic of algebraic expressions, multiplication of polynomials, solving equations and inequalities in one variable, laws of exponents, rational exponents and radicals, graphs of equations in two variables, linear functions, systems of linear equations, quadratic equations, conic sections, logarithmic and exponential functiions, factoring higher degree polynomials, and mathematical modeling. In addition to the regular four class meetings, this course uses a lab period to address the special needs of the students enrolled. Placement in this course is based on pretesting or recommendation of the Mathematics Department.

MA105 EUCLIDEAN GEOMETRY. One year (1 unit of credit).
This directed, individualized study of Euclidean Geometry covers a thorough treatment of parallel lines and planes, congruent and similar figures, right triangles and their properties, circles, areas, volumes, and constructions. The pace is determined by the student in consultation with the instructor. In previous years, students have completed the course in one to three semesters. Working by mail over the summer or credit by examination are options.

MA110 ALGEBRA 2/TRIGONOMETRY. One year (1 unit of credit).
Standard topics of Algebra 2 are studied from an advanced viewpoint. The course includes radicals, factoring polynomials, rational expressions, solution of a wide variety of equations in one variable, introduction to functions (including logarithmic and trigonometric functions), linear and non-linear systems of equations, conics, and complex numbers. Emphasis is placed on problem solving, especially in the context of "word problems."

MA112 ALGEBRA 3. One year (1 unit of credit).
Prerequisite: Algebra 2
This junior level course reviews and extends the concepts of Algebra 2 through the use of mathematical models involving functions. The course includes manipulation of expressions, equation solving, linear functions, quadratic functions, polynomials, graphing, conic sections, exponentials, logarithms, complex numbers, systems of equations, sequences and series, and real-life word problems. Placement in this course is based on pretesting or recommendation of the Mathematics Department.

MA115 ALGEBRA 2/INTRODUCTION TO COLLEGE MATHEMATICS One year (1 unit of credit).
Topics of Algebra 2 and Introduction to College Mathematics are covered. Students enrolled in this course have not previously taken Algebra 2. The presentation of topics is fast paced and homework is extensive. Topics included are those of MA110 Algebra 2/Trigonometry plus a thorough discussion of the families of elementary functions, inequalities, elementary statistics, applications, and algorithms. A student successfully completing this course typically selects Calculus 1 and 2 as a senior. Placement in this course is determined by the Mathematics Department.

MA120 INTRODUCTION TO COLLEGE MATHEMATICS. One year (1 unit of credit).
Prerequisite: Algebra 2 or Algebra 3
The families of elementary functions are treated in detail as tools for building mathematical models. A graphical approach is emphasized throughout. Data representation, data analysis, elementary statistics (especially Exploratory Data Analysis), algorithms, and matrices are addressed through timely applications. Special emphasis is placed on the use of calculator and computer to aid in solving problems.

MA125 INTRODUCTION TO COLLEGE MATHEMATICS AND TOPICS. One year (1 unit of credit).
Prerequisite: Algebra 2
This course is a fast paced and more extensive study of the topics of MA120 Introduction to College Mathematics and also permits exposure to other selected topics. Placement in this course is determined by the Mathematics Department.

MA215 INTRODUCTION TO MICROCOMPUTERS: TRUE BASIC. One semester, two meetings a week (1/2 unit of credit).
Students explore the applications of microcomputers to science, industry, and management. The True Basic language is used as the vehicle to introduce the fundamentals of structured programming. Attention is given to some of the fundamental concepts of computer science, especially the analysis and coding of algorithms. The course is graded Satisfactory/Unsatisfactory.

MA220 INTRODUCTION TO MINICOMPUTERS: PASCAL. One semester, three meetings a week (1/2 unit of credit).
Students will work with two operating systems, VMS and UNIX. The Pascal language will be explored in depth, especially data structures and their role in structured programming. Students taking this course should be familiar with the concepts and programming covered in MA215 Intoduction to Microcomputers: True Basic. This course is graded Satisfactory/Unsatisfactory.

MA225 ADVANCED PROGRAMMING: C. One semester, three meetings a week (1/2 unit of credit).
The C language is explored in depth. The accepted practices for the design and coding of large programs are treated. The C language is used in both VMS and UNIX environments. This course requires the completion of a major project that will place demands upon each student.

MA230 EXPLORATORY DATA ANALYSIS. One semester, two meeting a week (1/2 unit of credit).
This course is intended to be taken in combination with another mathematics course. The course builds upon the introduction to EDA in MA115 Algebra 2/Introduction to College Mathematics, MA120 Introduction to College Mathematics, and MA125 Introduction to College Mathematics and Topics. Additional topics include an indepth treatment of re-expression, polishing the fit, smoothing, and Q-Q plots.

MA300 SURVEY OF FINITE MATHEMATICS. One semester (1/2 unit of credit).
Prerequisite: MA120 Introduction to College Mathematics
This course offers an overview of many topics in finite mathematics with an emphasis on their applications. Included are topics in elementary probability and counting procedures, random variables and expected value, matrix algebra, and Markov chains.

Also included are applications of linear programming and the Simplex algorithm. These topics are used to study optimizing profit, resource allocation, the analysis and modeling of observed behavior, and the theory of games. The course involves numerous computer simulations.

MA302 NUMBER THEORY/MATHEMATICAL LOGIC. One semester (1/2 unit of credit).
Prerequisite: MA120 Introduction to College Mathematics
This course includes an introduction to mathematical logic and the study of number theory. Topics in number theory include divisibility properties of integers, primes, the Euclidean Algorithm, bases, congruences, Diophantine equations, and algebraic number fields. The concept of proof is developed over the semester.

MA310 HISTORY OF MATHEMATICS. One semester (1/2 unit of credit).
Prerequisite: MA120 Introduction to College Mathematics
From an historical viewpoint, the development of mathematical thought and evolution of mathematical ideas is examined. Techniques and procedures of significant centuries are studied to reinforce the historical sense of the development of mathematics.

MA312 STATISTICS. One semester (1/2 unit of credit).
Prerequisite: MA120 Introduction to College Mathematics
This course includes both descriptive and inferential statistics. In descriptive statistics, students learn to describe sets of data with various statistics, including mean and standard deviation. In inferential statistics, students learn to infer characteristics of a large population from a small sample of that population. They also learn to test claims made by scientists and advertisers. Tools used include confidence intervals, Chi-square tests, and curve fitting techniques as well as some non-parametric tests. The course includes applications from a wide variety of fields including quality control, agriculture, political polls, dieting programs, college board tests, and college admissions. Exploratory Data Analysis is covered in some detail. Students are introduced to Minitab on our minicomputer for processing larger data sets.

MA315 CALCULUS 1 AND 2. One year (1 unit of credit).
Prerequisite: A or B average in MA120 Introduction to College Mathematics
This course provides a rigorous study of two semesters of college calculus. Topics include limits, differentiation, integration, transcendental functions, curve sketching, physical applications, methods of integration, indeterminate forms, improper integrals, polar coordinates, infinite series, and an introduction to ordinary differential equations. Students may elect to take the Calculus BC Advanced Placement Examination.

MA320 CALCULUS 1 AND 2 WITH TOPICS. One year (1 unit of credit).
Prerequisite: Permission of the Mathematics Department
This course is a faster-paced and more indepth study of the topics in MA315 Calculus 1 and 2. Topics outside of the usual calculus curriculum are also included. Students may elect to take the Calculus BC Advanced Placement Examination.

MA405 CALCULUS 3. One semester (1/2 unit of credit).
Prerequisite: MA315 Calculus 1 and 2
This is a course in calculus of several variables, including vector analysis, partial differentiation, multiple integrals, and line and surface integrals.

MA410 TOPICS IN DISCRETE MATHEMATICS. One semester (1/2 unit of credit).
Prerequisite: Permission of the Mathematics Department
The purpose of this course is to give advanced students an opportunity to study topics not usually offered in a high school curriculum. Topics are included from the areas of combinatorics, linear algebra, and probability and statistics, with an emphasis on mathematical models and algorithms. Students are expected to do extensive independent work and give presentations to the class.

MA415 TOPICS IN MODERN ALGEBRA AND APPLICATIONS. One semester (1/2 unit of credit).
Prerequisite: Permission of the Mathematics Department
The purpose of this course is to give advanced students an opportunity to study topics not usually offered in a high school curriculum. Topics vary with the instructor and student interest. Whenever possible, the course attempts to address the applications of algebraic structures to the sciences, business, statistics, and decision making.

MA417 MATHEMATICAL MODELING. One Semester (1/2 unit of credit).
Prerequisite: Permission of the Mathematics Department
Advanced students are introduced to the creative and analytic aspects of modeling real-world phenomena. Models from engineering, biology, political science, management science, and everyday life are examined through a variety of techniques. When presented with a situation, students learn to propose, test, and revise an appropriate model. The course is project oriented and group work is encouraged.

MA420 ADVANCED MATHEMATICAL TOPICS. One semester (1/2 unit of credit).
Prerequisite: Permission of the Mathematics Department
This course offers an opportunity for students with an especially strong background in mathematics to pursue a rigorous study of a topic outside the standard curriculum. The topic chosen may be in mathematics or a mathematical study of computer science. Students are expected to make formal presentations and to write a paper on the topic.

DEPARTMENT OF SCIENCES

The aim of the Department of Sciences at the North Carolina School of Science and Mathematics is to give all students an introduction to each of the basic sciences (biology, chemistry, physics) and to allow them to pursue their particular interests by taking elective courses in areas of their choice. To meet graduation requirements in science, a student must complete three units of science while in residence at the North Carolina School of Science and Mathematics and show competence in each of the three sciences, either by passing an introductory course or by taking a test to be exempted from the first course. A student exempted from a course must still complete three units of science credit by adding either an advanced course or other science electives.

Each of the sciences will have a standardized test available at the beginning of the year to allow students to be exempted ftom introductory courses. By taking a test a student will be able either to advance immediately to a higher level course in this area or to spend the time in other science courses which might be of more interest.

Biology

Graduation Requirement in Biology

The graduation requirement in biology may be fulfilled by:

1. exemption by a standardized examination given during the opening of the fall semester and the recommendation of the North Carolina School of Science and Mathematics biology faculty; OR

2. a year-long biology course (BI405, BI410); OR

3. sucessful completion of a combination of semester biology courses totaling one unit of credit.

Recommended Placement

All incoming students will be given a placement examination. If the examination discloses a weakness in a particular area of biology, it will be recommended that the student take one or both of the 100-level courses. Students are advised to take any recommended 100-level courses before registering for 200 or higher level biology courses.

Course Offerings

BI105 CHEMISTRY, FORM AND FUNCTION IN BIOLOGICAL SYSTEMS. One semester (1/2 unit of credit).
This is an audio-tutorial course designed as a personalized system of study. Students study the atomic and molecular bases of cell structure, energy transformations in the cell, homeostasis and the systems of the body. The systems include the nervous, endocrine, circulatory, respiratory, digestive and reproductive systems.

BI106 GENETICS AND DIVERSITY OF ORGANISMS. One semester (1/2 unit of credit).
This is an audio-tutorial course designed as a personalized system of study. Students focus on cell reproduction, observable patterns of inheritance, molecular genetics, gene function, and human genetics. Students also develop concepts of biological classification and learn the characteristics of various plant and animal phyla.

BI205 CELL BIOLOGY AND BIOCHEMISTRY. One semester (1/2 unit of credit).
This course examines in detail cellular structure and function common to most eucaryotic cells. Basic biochemical principles are presented as an introduction to protein structure, enzyme function, and bioenergetics. In the second half of the course students extend these principles to group projects dealing with areas of cell biology such as nutrition, aging, and drugs. Videotapes, speakers, and field trips supplement the course.

BI214 BIOPHYSICS. One semester (1/2 unit of credit; 1/4 each in biology and physics).
Prerequisite: One semester of biology; one semester of PH105 Physics or PH107 Physics and Topics
This course explores a variety of biological systems and questions from the point of view of physics laws. Examples are drawn from mechanics (bone and muscle strength and elasticity; scaling and the sizes of plants and animals), fluid statics and dynamics (flying and swimming organisms; air and blood circulation; the physical and chemical properties of water which lead to its uniqueness as a base fluid of life), light and sound waves (how living organisms sense their environment; the origins and purposes of plant and animal colorings) and electromagnetism (hydrogen bonding in protein and DNA synthesis; the nervous system; magnetism and bird navigation). Biotechnological advances (laser surgery; NMR, tomographic, and ultasound imaging; radioactive tracing; electrocardio- and electroencephalography; radiation therapy) are discussed wherever relevant.

BI215 BEHAVIOR OF PLANTS AND ANIMALS. One semester (1/2 unit of credit).
Response to stimuli is a charactistic of all living things. These responses (behaviors) are examined as well as the physiology involved in the responses. Organisms as varied as protozoa, plants, and humans, and behaviors as varied as parenting, food-getting, and defense are studied.

BI216 ANATOMY AND PHYSIOLOGY. One semester (1/2 unit of credit).
Students study the structure and function of the major organ systems with emphasis on system integration and homeostasis; primary concentration is on mammalian systems.

BI218 SURVEY OF THE LIVING KINGDOMS. One semester (1/2 unit of credit).
Students study the biology and classification of the five kingdoms, and representative organisms within each of the five. The organisms studied include bacteria, protists, fungi, plants and animals, with major emphasis placed on the flowering plants and invertebrates. Emphasis is also placed on field work and laboratory work, including dissection of representative organisms.

BI221 GENETICS. One semester (1/2 unit of credit).
The course begins with the fundamentals of cell division. It then traces the development of genetics from the pea plants of Mendel, through the double helix model of Watson and Crick, to the current topics of gene regulation and recombinant genetics. Genetic principles are applied to such areas as cancer, cellular differentiation, human aging and genetic counseling. Laboratory activities and critical thinking skills are heavily emphasized; students are expected to develop their own theories of gene regulation and design some of their own laboratory experiments. Field trips, video tapes and outside speakers supplement the entire course.

BI224 EMBRYOLOGY AND EVOLUTION. One semester (1/2 unit of credit).
This course explores the development of vertebrates as individual organisms and as a subphylum. Fish, amphibians, and birds are used as specific examples of embryology. The evolution of all kinds of life is studied with particular emphasis on vertebrates and humans.

BI233 ECOLOGY. One semester (1/2 unit of credit).
The course begins with concepts including the "niche", competition, predation, ecological energetics, nutrient cycling, diversity and biomes. Lab activities are used extensively to demonstrate and extend these concepts. During the second half of the course, the emphasis shifts to field activities. Terrestrial and aquatic habitats are visited and studied. The course then concludes with the ecology of man. During this portion students use ecological concepts to study man's relationship to his environment and develop their own positions

concerning several current environmental issues.

BI305 BIOETHICS. One semester (1/2 unit of credit; 1/4 each in biology and social science).
In this course students consider the ethical questions arising from discoveries of modern biology, including genetic counseling, genetic engineering, in vitro fertilization, medical research, transplants, euthanasia, and other issues.

BI306 HUMAN SEXUALITY. One semester (1/2 unit of credit; 1/4 each in biology and social science).
This course is an integrated, interdisciplinary approach to basic biological and social science concepts of sexuality, including an exploration of the ways in which cultures both determine and reflect the differences in male and female roles.

BI405 RESEARCH IN BIOLOGY. One year (1 unit of credit).
Prerequisite: Adequate score on biology placement examination and permission of the instructor
This course is designed to allow students to pursue individual research problems in biology. Students learn to use library resources, gain experience in scientific writing, receive closely supervised training in techniques commonly used in research, and receive instruction in laboratory safety and proper experimental design. Each student designs and carries out a research project under the supervision of the instructor. Students are encouraged to enter their projects in regional and national research competitions. This course is open both to juniors and to seniors; juniors are particularly encouraged to enroll.

BI410 SURVEY OF ADVANCED BIOLOGY. One year (1 unit of credit).
Prerequisite: Adequate score on the biology placement examination and permission of the instructor
This course is a survey of the field of biology. Lecture is kept to a minimum. Emphasis is placed on open-ended lab experiments and student involvement. Students who master content material will be prepared for the Advanced Placement Examination.

Chemistry

Graduation Requirement in Chemistry

The graduation requirement in chemistry may be fulfilled by:

1. exemption by the American Chemical Society High School Chemistry Standardized Examination given during the opening of fall semester and the recommendation of the North Carolina School of Science and Mathematics chemistry faculty; OR

2. a year of CH105 General Chemistry, CH110 General Chemistry and Topics, or CH205 Advanced Chemistry at the North Carolina School of Science and Mathematics. This graduation requirement is not fulfilled by CH305 Organic Chemistry, CH307 Environmental Chemistry, CH310 Chemical Instrumentation, CH315 Polymer Chemistry or CH320 Organic Spectroscopy.

Placement

An incoming student who has had little or no previous chemistry will normally enroll in either CH105 General Chemistry or CH110 General Chemistry and Topics depending on the level of preparation in mathematics and science.

An incoming student who has had a year of chemistry before coming to the North Carolina School of Science and Mathematics will normally enroll in CH205 Advanced Chemistry. A placement test is given during the first three weeks to make certain that students in this course are properly placed.

An incoming student who is exempt from the graduation requirement in chemistry (see above) may enroll directly in one of the more advanced chemistry elective courses with permission of the instructor.

Course Offerings

CH105 GENERAL CHEMISTRY. One year (1 unit of credit).
This introductory course presents the basic principles of chemistry in a manner that is understandable to the beginning student. Classroom and laboratory time is devoted to the development of insight into such basic concepts as atomic theory, chemical bonding, molecular structure, chemical thermodynamics, kinetic theory, and chemical equilibrium.

CH110 GENERAL CHEMISTRY AND TOPICS. One year (1 unit of credit).
Co-requisite: MA115 Algebra 2/Introduction to College Mathematics or higher mathematics
This course covers the same topics as CH105 General Chemistry, but students should expect to move at a faster pace and to examine many areas in greater depth. An advanced general chemistry text is used.

CH205 ADVANCED CHEMISTRY. One year (1 unit of credit).
Prerequisite: CH105 General Chemistry, CH110 General Chemistry and Topics or permission of the instructor
This course is designed for students who have taken an introductory chemistry course before coming to the School, and also serves as a continuation of either CH105 General Chemistry or CH110 General Chemistry and Topics. It is especially recommended for those who wish to prepare for the Advanced Placement Chemistry Examination.

CH305 ORGANIC CHEMISTRY. One year (1 unit of credit).
Prerequisite: CH105 General Chemistry or permission of the instructor
This course introduces topics on the structure and synthesis of organic compounds. Special emphasis is given to biologically important organic compounds. The laboratory involves isolation, analytical and synthetic techniques. Instrumental techniques such as infrared and nuclear magnetic resonance spectrometry are used.

CH307 ENVIRONMENTAL CHEMISTRY. One year (1 unit of credit).
Prerequisite: CH105 General Chemistry and permission of the instructor
This course explores the chemistry of various environmental processes including acid rain, the greenhouse effect, and the nitrogen cycle and seeks to develop analytical techniques to monitor some of these processes.

CH310 CHEMICAL INSTRUMENTATION. One year (1 unit of credit).
Prerequisite: CH105 General Chemistry and permission of the instructor
Co-requisite: MA115 Algebra 2/Introduction to College Mathematics or higher mathematics
Students have hands-on experience with a wide variety of instrumentation commonly found in chemical laboratories. Each student designs and carries out original experiments after learning about the theory and operation of each instrument. The first semester is devoted to chemical separations and independent projects. Chemical separation techniques studied include column chromatography, gas-liquid chromatography, high pressure liquid chromatography, and electrophoresis. The second semester covers spectroscopy and electrochemistry, including fluorometry, polarography, infrared, and nuclear magnetic resonance spectroscopy.

CH315 POLYMER CHEMISTRY. One semester (1/2 unit of credit).
Prerequisite: CH105 General Chemistry and permission of the instructor
Polymers are an ever-increasing part of our lives. From textile polymers to biopolymers, these chemicals are ever present in technology as well as in the natural world. In this course the chemical and physical properties of these are explored and the synthesis of many polymers is done in the laboratory.

CH320 ORGANIC SPECTROSCOPY. One semester (1/2 unit of credit).
Prerequisite: CH105 General Chemistry and permission of the instructor
This course offers a new approach to studying organic chemistry. Infrared, ultraviolet, and visible spectroscopy and nuclear magnetic resonance are the cornerstones of this approach. Functional groups are studied through their bond characteristics.

Physics

Graduation Requirement in Physics

The graduation requirement in physics may be fulfilled by:

1. exemption by a standardized examination given during the opening of fall semester and the recommendation of the North Carolina School of Science and Mathematics physics faculty; OR

2. a year of PH105 Physics or PH107 Physics and Topics at the North Carolina School of Science and Mathematics.

Placement

Students who have had a year of physics before coming to the North Carolina School of Science and Mathematics and who want to enroll in a higher level physics course will be given a standardized examination at the beginning of the fall semester.

Course Offerings

PH105 PHYSICS. One year (1 unit of credit).
This course provides a sound, algebra-based foundation in the principles of classical physics. The first semester covers the laws of mechanics and their applications. The second semester covers wave motion and the laws of electricity and magnetism. Throughout both semesters, topics in modern physics are included where appropriate.

PH107 PHYSICS AND TOPICS. One year (1 unit of credit).
Co-requisite: MA115 Algebra 2/Introduction to College Mathematics or higher mathematics
This course covers the topics of PH105 Physics but in greater depth and at a faster pace. It has a greater mathematical emphasis than PH105 and uses a more advanced text.

PH115 APPLIED ELECTRONICS. One semester (1/2 unit of credit).
The emphasis of this course is on the practical application of electronics. Students begin by learning about basic electronic circuits and then use solderless breadboards to build and use these circuits in a variety of ways. This course is graded Satisfactory/Unsatisfactory.

PH120 ASTRONOMY. One semester (1/2 unit of credit).
Co-requisite: PH105 Physics or PH107 Physics and Topics
This course emphasizes the origin and evolution of the planets, stars, galaxies, and the universe without going into mathematical detail. Students are able to gain proficiency in the operation of the school's telescopes in the process of studying the motions of the sun, moon, and planets through the stars.

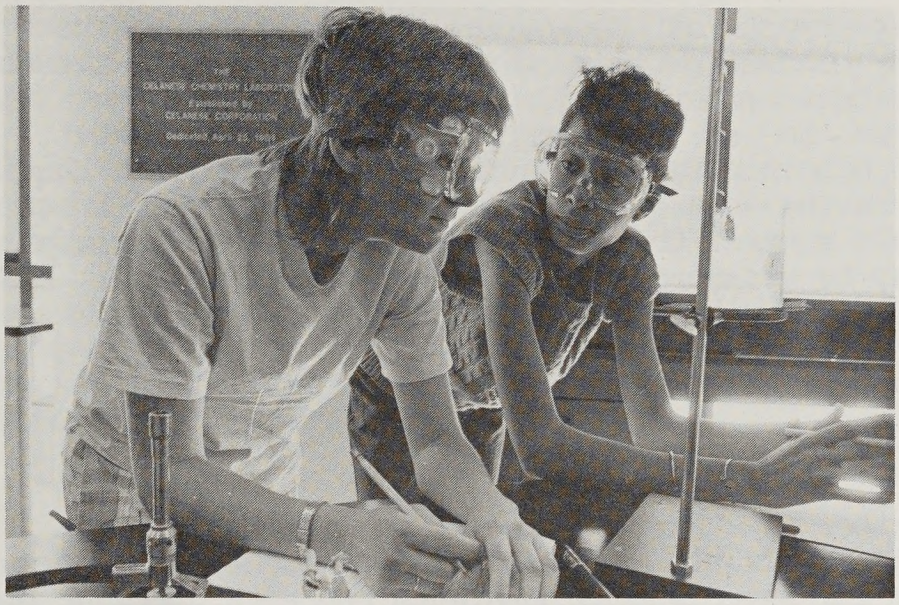
PH125 ASTROPHYSICS. One semester (1/2 unit of credit).
Co-requisite: PH105 Physics or PH107 Physics and Topics; MA115 Algebra 2/Introduction to College Mathematics or higher mathematics
Although this course covers the same topics as PH120 Astronomy, more mathematics and more rigorous physical and chemical principles are integrated into the study of stellar and galactic structure and evolution. Students have the option of pursuing theoretical (including computer-oriented) projects and/or observational (telescope) projects.

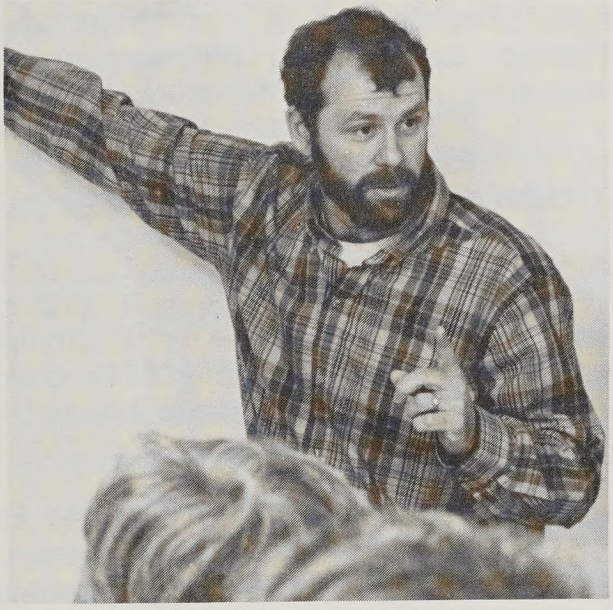
PH200 MODERN PHYSICS. One semester (1/2 unit of credit).
Prerequisite: PH105 Physics or PH107 Physics and Topics or permission of instructor
Co-requisite: MA115 Algebra 2/Introduction to College Mathematics or higher mathematics
This course surveys the physics developed during this century. Topics are selected from special and general relativity, atomic and nuclear structure, particle-wave duality, quantum mechanics, elementary particles, and grand unified theories.

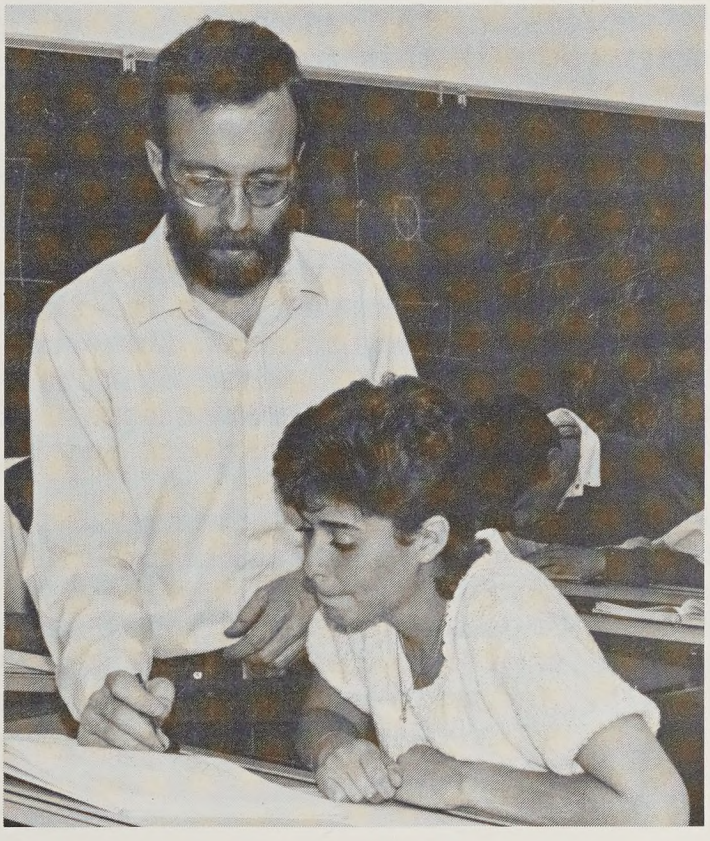
PH205 ADVANCED MODERN PHYSICS. One semester (1/2 unit of credit).
Prerequisite: PH105 Physics or PH107 Physics and Topics or permission of instructor
Co-requisite: MA315 Calculus 1 and 2 or higher mathematics
This course covers the same concepts as PH200 Modern Physics but uses calculus derivations for several classical physics models: the quantum mechanical Schroedinger solution for the particle-in-the-box problem, the harmonic oscillator, and electron probability distributions for the hydrogen atom.

PH210 ADVANCED PHYSICS. One year (1 unit of credit).
Prerequisite: PH105 Physics or PH107 Physics and Topics
Co-requisite: MA315 Calculus 1 and 2 or higher mathematics
This course provides a rigorous treatment of classical mechanics, using calculus where appropriate in problem solving and derivations. The second half of the course has primary emphasis on electricity and magnetism, with concepts of calculus again used in discussing principles and in solving problems. Other topics, which are covered to a lesser extent, include optics, heat, wave motion, relativity, and quantum mechanics. This course may be used to prepare for the Advanced Placement Physics C Examination.

Note: See also in biology the course description of BI214 Biophysics which grants 1/4 unit of credit in physics.







DEPARTMENT OF HUMANITIES

The course offerings in the Department of Humanities attempt to sharpen the students' decision-making and communications skills, enlarge the students' understanding of their own culture and other cultures, and increase their appreciation of major art forms in an intellectual and applied context. The Department offers each student an opportunity to select from a variety of required and elective courses. Students having an exceptionally strong background in one of the junior year requirements should contact the Department Head so that appropriate testing for placement purposes may be arranged.

Art

Course Offerings

AR105 ART APPLICATIONS. One semester (1/2 unit of credit).
This course exposes students to four valuable art skills in one semester. Drawing in pencil, charcoal, pen and ink introduces students to concepts of right brain stimulation, seeing and analyzing reality, and interpreting reality by using abstract expression to respond to their personal feelings. All sections of the course start out with this foundation and then proceed to a varying sequence of three more skills.

Screen printing is used to apply drawing skills to a major printmaking technique and to provide an avenue for creative self-expression through the use of symbols.

The medium of photography exposes students to concepts of physics and chemistry while giving them an opportunity to examine their physical environment and make emotional statements along selected themes.

Activities in ceramics give students opportunities to learn about three dimensional expression in both utilitarian objects and in expressive sculpture.

AR110 MECHANICAL DRAWING. One semester (1/2 unit of credit).
This course provides in-depth training in drawing to students considering careers in engineering and architecture and for those students desiring ways to make themselves more effective in visually communicating technical information in any profession. The goal of this individually paced course is to master engineering and technical drawing tools. Computer-aided design is introduced.

AR205 ADVANCED PHOTOGRAPHY. One semester (1/2 unit of credit).
Prerequisite: Prior photography experience
This course is designed to provide the experienced photographer with advanced darkroom, studio, and in-the-field skills. Color photography is introduced. Class begins with formal instruction and evolves toward independent student work.

AR210 ADVANCED MECHANICAL DRAWING. One semester (1/2 unit of credit).
Prerequisite: AR110 Mechanical Drawing
This advanced course emphasizes product design, assembly drawing, and exploded views. Architectural drafting is introduced with emphasis on floor plans, site plans, elevations, perspective drawing, exterior and interior building details, and the development of a personal lettering style. The final project is an original design of a building, space, or functional object complete with all drawings necessary for its construction.

English

Senior English: Each student is required to earn 1/2 unit of credit in English during each semester of the senior year. In at least one of these semesters the student must be enrolled in a literature course.

Junior English: Juniors are required to enroll in EN105 Writing and American Literature.

Course Offerings

EN105 WRITING AND AMERICAN LITERATURE. One year (1 unit of credit).
This course provides students with the opportunity to develop writing skills while studying major works of American literature. The writing study seeks to develop and enhance skills of communication and expression of ideas. The literary study focuses on the uniquely American characteristics of these works, their larger thematic implications, and their artistic merit.

EN205 BRITISH LITERATURE. One semester (1/2 unit of credit).
Students survey the literature of England from the beginning to 1600. Students continue to develop and practice skills in composition and rhetoric introduced in the junior year, through various analytical, expository, appreciative, and creative assignments.

EN206 BRITISH LITERATURE. One semester (1/2 unit of credit).
This course is a survey of the literature of England from 1600 to the present. Special attention is given to major writers and to works of each period. Students continue to develop and practice skills in composition and rhetoric introduced in the junior year, through various analytical, expository, appreciative, and creative assignments.

EN210 ADVANCED WRITING. One semester (1/2 unit of credit).
In this course students continue to study examples of expository, argumentative, technical, and creative writing. Students are expected to produce work in several of these types and are encouraged to do additional work in those areas which most interest them.

EN305 WISDOM, REVELATION, REASON, AND DOUBT. Interdisciplinary 1-year 2-credit course for seniors (1 unit of credit in English; 1 unit of credit in social science).
This course integrates the political, cultural, social and intellectual history of the West with the study of literature and the visual arts. Students read, discuss and write about literary and historical materials.

EN310 AFRICA, ASIA, SOUTH AMERICA: LITERATURE AND HISTORY. Interdisciplinary 1-semester 1-credit course for seniors (1/2 unit of credit in English; 1/2 unit of credit in social science).
This course covers three areas of non-Western literature and history, with approximately one third of the semester on each one: Latin and South America, Africa, and Asia. For each area, there are comprehensive readings in political and social history and readings in literature (fiction, poetry, and drama) of representative writers and periods. Emphasis, however, is on contemporary history and literature in each area.

Foreign Languages

Every student must enroll in a foreign language during the junior year. Students who can prove competency by testing at the completion level of the third year of a foreign language may consult the Department Head for a modification of this requirement. Note: Any student who begins a foreign language in the junior year must continue that language in the senior year, regardless of prior foreign language credits.

Course Offerings

CL110 INTERMEDIATE CHINESE. One year (1 unit of credit).
In this course students continue acquisition of the basic grammatical elements of the language with increased emphasis on vocabulary building as well as oral and written self-expression. Films, tapes and guest speakers are used for cultural enrichment and aural comprehension. The basic concepts, themes and events of Chinese history are explored.

FR105 FRENCH 1. One year (1 unit of credit).
Emphasis in this course is placed on the acquisition of basic language skills: speaking, listening, comprehension, reading, and writing. The student acquires a base vocabulary and learns the simple grammatical constructions needed for essential communication. Cultural aspects of the people are also introduced.

FR205 FRENCH 2. One year (1 unit of credit).
While emphasis on basic language skills is continued, the student's competency in the language is further increased by (1) reading short texts, (2) oral discussion of material read by the class, (3) greater use of the language in everyday conversational situations, and (4) creative expression which may take the form of written compositions, oral reports, and short skits. Most of the grammatical constructions are learned.

FR305 FRENCH 3. One year (1 unit of credit).
This course continues development of skills in oral, written, and aural French. The fine points of grammar, complex verb tenses, and idiomatic expressions are treated in depth, with emphasis on using these structures in composition and conversation. Le Petit Prince and a variety of literary excerpts are read and combined with culture units on French-speaking countries.

FR405 FRENCH 4. One year (1 unit of credit).
This course examines an extensive list of sixteenth through twentieth century French literary masterpieces in a variety of genres. Students are expected to acquire skills in French literary analysis, discussion, and composition. This class prepares students to take the Advanced Placement French Literature Examination in May.

GE105 GERMAN 1. One year (1 unit of credit).
Emphasis in this course is placed on the acquisition of basic language skills: speaking, listening, comprehension, reading, and writing. The student acquires a base vocabulary and learns the simple grammatical constructions needed for essential communication. German culture is also introduced. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

GE205 GERMAN 2. One year (1 unit of credit).
Emphasis on basic language skills begun in German 1 is continued. The student's competency in the language is further increased by the reading and discussion of short texts. The more complex grammatical constructions are learned and practiced. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

GE305 GERMAN 3. One year (1 unit of credit).
The student continues development of skills in oral, aural, and written German. A systematic review of grammar is conducted with emphasis placed on the fine points not covered in levels one and two. Reading modern short stories, poems, and one full-length play serves as an introduction to German literature, and frequent compositions require the students to synthesize what they have learned. Tapes, films, and videotapes aid in advancing listening comprehension skills as well as providing information on German culture.

LA105 LATIN 1. One year (1 unit of credit).
Students gain mastery of the essentials of Latin grammar, with particular emphasis on English derivatives and vocabulary building. Cultural aspects of the Greek and Roman world are also introduced. Attention is given to development of translation skills. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

LA205 LATIN 2. One year (1 unit of credit).
Review and further study of the essentials of Latin grammar are stressed. Increased emphasis is placed on reading and translation of ancient authors. Elements of Roman history are also introduced. Continued stress is placed on English vocabulary development and stylistics. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

LA305 LATIN 3. One year (1 unit of credit).
Emphasis is on readings of classical authors and their cultural environment. Students are introduced to supplementary areas in the field of classical studies (religion, art, and history, among others). There is continuing development of prose composition skills and vocabulary building.

RU105 RUSSIAN 1. One year (1 unit of credit).
This course is an introduction to the Russian language with emphasis on conversation, reading, writing, and acquisition of the basic grammatical constructions. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

RU205 RUSSIAN 2. One year (1 unit of credit).
In this course, students continue acquisition of the basic grammatical elements of the language with increased emphasis on vocabulary building and oral self-expression. Filmstrips are used for cultural enrichment and aural comprehension. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

SP105 SPANISH 1. One year (1 unit of credit).
Emphasis in this course is placed on the acquisition of basic language skills: speaking, listening, comprehension, reading, and writing. The student acquires a base vocabulary and learns the simple grammatical constructions needed for essential communication. Cultural aspects of the people are also introduced. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

SP205 SPANISH 2. One year (1 unit of credit).
While emphasis on basic skills is continued, the student's competency in the language is further increased by (1) reading short texts, (2) greater use of the language in everyday conversational situations, (3) oral discussion of material read by the class, and (4) creative expression which may take the form of written compositions, oral reports, and short skits. Most of the grammatical constructions are learned. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

SP305 SPANISH 3. One year (1 unit of credit).
In this course reading selections of increasing difficulty from literature and culture form the basis for study and discussion by the class. The more complex grammatical constructions of the language are studied and reviewed. Filmstrips are used as a vehicle for cultural enrichment, vocabulary building, and grammar review. Oral and written reports are also used as a means of sharpening the student's skills in the language. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

History and Social Sciences

Junior requirement: each junior is required to complete one year in Advanced American Studies for 1 full unit of graduation credit. The student may select from the following options:

1. SS105 American Society: History and Culture OR

2. SS106 "Telling Lives": History as Biography (first semester) and
SS108 Arms and Ambassadors: Diplomacy and its Failures (second semester).

Each of the courses described below contains a Strategies in Learning component, which is designed to enhance students' abilities to communicate in various forms. Emphasis is placed on research, writing, reading, oral, visual, map, computer, and decision-making skills.

Students who have had an American History course in the tenth grade must preregister for one of the above options and may, upon arrival, consult the Department Head for consideration of alternative placement for social science credit.

Course Offerings

SS105 AMERICAN SOCIETY: HISTORY AND CULTURE. One year (1 unit of credit).
This interdisciplinary course traces the development of the United States from 1607 until the present in chronological sequence. Emphasis is placed on social, intellectual, political, economic, and cultural trends.

SS106 "TELLING LIVES": HISTORY AS BIOGRAPHY. Semester 1 (1/2 unit of credit).
This course, using an interdisciplinary approach, takes an in-depth look at critical periods of American life through an examination of the lives of politicians, scientists, artists, musicians, writers, economists, statesmen, and military figures.

SS108 ARMS AND AMBASSADORS: DIPLOMACY AND ITS FAILURES. Semester 2 (1/2 unit of credit).
The focus of this course is on an examination of America through its foreign policy and the wars in which it has been involved. Since foreign policy is but a reflection of domestic moods, attention will be given to internal developments and technological advances.

SS205 ECONOMICS: MONEY, MANAGEMENT, AND MARKETS. One semester (1/2 unit of credit).
Co-requisite: MA120 Introduction to College Mathematics or higher mathematics
This introductory course in economics provides students a significant opportunity to apply the techniques and learnings of mathematics and science to social problems. The course is a study of theories and institutions that organize and direct the economic activities of mankind. It is designed to help the student understand basic economics and the problems on which he or she will have to pass judgment.

SS210 RELIGION AND POLITICS. One semester (1/2 unit of credit).
During the first quarter students will study the major religions of the world. The focus will be in each religion's social significance and impact on modern world thought. In the second quarter students will examine the role and impact of various political groups, the media, and the world situation on traditional institutions and practices in political life today.

SS215 HISTORY OF SCIENCE AND TECHNOLOGY. One semester (1/2 unit of credit).
This course traces the basic development in scientific thought from the earliest time to the present. Beginning with "magic" as mankind attempts to deal with the mysteries of the universe, the course will proceed to discuss major scientific thinkers and inventors. Emphasis is placed on the societal context in which these developments occurred.

SS220 SOCIAL PSYCHOLOGY. One semester (1/2 unit of credit).
This introductory course deals with man as an individual and as a member of society. Combining both psychology and sociology, emphasis is placed on such areas as the development of personality, abnormal behavior, intellect vs. intelligence, socialization, social systems, and social interaction.

SS310 PHILOSOPHY AND MODERN SOCIETY. One semester (1/4 unit of credit).
Through a study of the problems discussed by major philosophers this course examines the nature of life for both the species in general, and the individual in particular. Problems studied include the nature and destiny of man, free will versus determinism, theories of knowledge, the nature of politics, and ethical decision-making. Students read critically selected works from Plato, Aristotle, Kant, Descartes, and Rousseau.

SS315 PHILOSOPHY AND THE MODERN PREDICAMENT. One semester (1/4 unit of credit). This course deals with the twentieth century philosophical movement called "Existentialism". The problems of anxiety, despair, loss of meaning, and death, which have been intensified by life in this century, are viewed through the eyes of the movement's major thinkers: Kierkegaard, Nietzsche, Heidegger and Sartre.

See also the following courses, which grant credit in social sciences:

BI305 BIOETHICS. One semester (1/2 unit of credit; 1/4 each in biology and social science). See course description in Biology.

BI306 HUMAN SEXUALITY. One semester (1/2 unit of credit; 1/4 each in biology and social science). See course description in Biology.

EN305 WISDOM, REVELATION, REASON, AND DOUBT. 1-year, 2-credit course for seniors. (2 units of credit; 1 each in English and social science). See course description in English.

EN310 AFRICA, ASIA, SOUTH AMERICA: LITERATURE AND HISTORY. 1-semester, 1-credit course for seniors. (1 unit of credit; 1/2 each in English and social science). See course description in English.

Music

Musical Performance: The following musical ensembles offer students the opportunity to study music through the medium of performance. Performance is seen not as an end in itself but as a means of developing an understanding of important ideas of music found in the repertoire of musical literature in a variety of historical periods and styles.

MU105 MIXED CHORUS. One semester (1/2 unit of credit); or one year (1 unit of credit).
Prerequisite: No previous musical experience necessary
MU110 CONCERT BAND. One semester (1/2 unit of credit); or one year (1 unit of credit).
Prerequisite: Previous instrumental study or ensemble experience
MU115 ORCHESTRA. One semester (1/2 unit of credit); or one year (1 unit of credit).
Prerequisite for string players: Previous instrumental study
Prerequisite for woodwind, brass and percussion players: Permission of instructor and previous band or orchestra experience

Other Course Offerings

MU120 INTRODUCTION TO MUSIC THEORY. One semester (1/2 unit of credit).
This course is an introduction to basic concepts in music theory through the examination of compositions from various periods and styles. Some of the questions addressed are: What makes a good melody? How is rhythmic interest achieved? Why is pitch so important in most compositions? How do good pieces achieve musical unity and variety? Other areas addressed include improvisation, composition, and the development of general listening skills.

MU220 ADVANCED MUSIC THEORY WITH AN HISTORICAL PERSPECTIVE. One semester (1/2 unit of credit)
Prerequisite: MU120 Introduction to Music Theory or permission of the instructor
This course continues with the musical concepts studied in MU120 but emphasizes the development of music theory skills and musical composition.

MU130 INTRODUCTION TO ELECTRONIC MUSIC. One semester (1/2 unit of credit).
Prerequisite: None; open to all students regardless of musical background
The purpose of this course is to provide an understanding of contemporary trends of electronic music through the media of musical performance, caomposition, and musical engineering. Although early electronic music was previously an experimental attempt to use new and unusual sounds, modern electronic music pervades the music industry of film scores, commercial music and popular styles. The course includes the development of basic knowledge and skills of synthesizer performance, audio engineering and musical composition and the study of the philosophical foundations of electronic music.

MU230 ADVANCED ELECTRONIC MUSIC. One semester (1/2 unit of credit).
Prerequisite: MU130 Introduction to Electronic Music or permission of the instructor
This course is essentially a continuation of MU130 Electronic Music 1, with particular emphasis on musical composition, the development of musical performance skills and the use of digital sequencers.

Physical Activity And Wellness

Every junior is required to participate in the Physical Activity and Wellness Program. This independent study course (PA105) is designed to promote healthy lifestyles through individual exercise programs and self-paced learning modules. Each student is required, both at the beginning of the junior year and at designated intervals throughout that year, to meet with the Physical Activity and Wellness instructor to design an appropriate program. The student's progress in this course, which is a graduation requirement, is evaluated with a grade each quarter. Every student must complete this course by the end of the junior year.

Course Offering

PA105 PHYSICAL ACTIVITY AND WELLNESS. One year (1/2 unit of credit). Required of all juniors. See paragraph above.

PA110 KINETICS. One semester (1/2 unit of credit).
This course approaches the study of the movement of the human body in an interdisciplinary way. Each student examines the motion of the major muscle groups and joints and selects a particular physical movement or activity for in-depth research.

Media Services

Course Offering

MS105 VIDEO PRODUCTION. One semester (1/2 unit of credit).
This course focuses on the main areas of production and post production: scripting/storyboarding, producing, editing. Students develop a technical vocabulary, learn to use the equipment, and produce two video programs.

STUDY OPTIONS AND SPECIAL PROGRAMS

ME105 MENTORSHIP PROGRAM. One year (1 unit of credit).
Prerequisite: Students planning a mentorship must register for the Mentorship Program (ME105) at the time of preregistration. Elective credit.
Students spend three to five hours per week assisting professional researchers in area universities, institutions, and industries in the following fields: mathematics, science, engineering, and medicine. Pairing of researchers and students is arranged by a Mentor Program Coordinator who also monitors the plan and objectives of the student's participation. A periodic evaluation is completed jointly by the mentor, the student, and the coordinator.

INDEPENDENT STUDY
Prerequisite: Approval of sponsoring members of the faculty and the Principal Elective credit.
Independent Study is available to any student who wishes to explore a topic or area of interest not offered in the curriculum. The student and the instructor together design the program of study and determine the number and frequency of meetings and the amount of credit to be earned. This option is available in all disciplines with the length of program left to the discretion of instructor.

INDIVIDUALIZED STUDY
Prerequisite: Approval by the instructor of the course and the Principal
Individualized Study is a contract between student and teacher which allows a student to move at his own pace and style through a course offered in the regular curriculum.

SEMINARS
Prerequisite: Approval of sponsoring members of the faculty and the Principal Elective credit.
A limited number of teams of three or more students are authorized to develop, with faculty and staff guidance, seminar investigations in various subjects or combinations of subjects. In these seminars the content, the method of learning, and the resources used are largely determined by the student team. The amount of credit awarded varies with each seminar.

LIBRARY AND MEDIA SERVICES

Extensive library and media facilities are available to students and faculty at the North Carolina School of Science and Mathematics. On-campus print and media collections are fortified by material available through interlibrary loans from area universities and North Carolina State libraries. Opportunities are provided to explore and use a wide variety of communications and information research tools, ranging from film and video to microfilms and computer-based information services. Students have opportunities for Work Service placement as library or media production aides.

RESIDENTIAL LIFE PROGRAMS

COMMUNITY SERVICE

As a requirement for graduation, students must successfully complete the appropriate number of hours required for the Community Service option they select. This program provides an opportunity for students to be of service to the community while learning about community life, the working world, and themselves.

WORK SERVICE

As a requirement for graduation, students must successfully complete four semesters of Work Service. Each student is expected to be cooperatively involved in one of a variety of work service duties for three hours each week. Contributions of time and energy provide not only a financial benefit to the School and ultimately to the students but also permit a sense of communal involvement which creates a bond between those participating and their environment.

MINIMUM GRADUATION REQUIREMENTS

Subject	Credits Earned at Previous School	Additional Credits Required by NCSSM	Total Number of Credits Required
English	2	2	4
Mathematics	2	2	4
Science	1	3	4
Social Science	1	1	2
Foreign Language	0	2	2
or	1	1	2
or	2	1	3
Physical Activity and Wellness	1	0.5	1.5
Electives	1	1.5	2.5
TOTAL	8	12	20

Graduation Requirements, continued

Satisfactory participation as indicated by a final report grade of "S" in Community Service and Work Service, a passing score on the annual statewide competency test, and demonstration of computer literacy are other requirements for graduation.

In addition to satisfactory completion of the above requirements, students are expected to exhibit responsible behavior toward other students, the school, the community, and the State as a condition of continuing enrollment and graduation.

Opportunities to develop and demonstrate responsible behavior are an integral part of the living/learning concept through work service, community service, and various residential life and independent study programs.

Students who do not meet standards of behavior as determined by the administration of the school or specifically stated in the Student Handbook may be required, after due process, to withdraw from the school. In such cases a diploma from the school will not be awarded to the student.

Special Notice

This catalog lists all of those courses which the School is prepared to offer. Since the total enrollment of the School is relatively small, it may not be possible to offer all courses every year. If the enrollment for a given course does not meet the minimum number required to justify faculty time, the course may be cancelled. In planning their course selections for elective courses, students should be prepared to consider alternative courses if their first choice is not available.